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Major Milestones Achieved in Vigilante UAV Program

U.S. Army Aviation Applied Technology Directorate

The Aviation Applied Technology Directorate, Fort Eustis, Va., successfully fired four 2.75-inch rockets from the test bed Vigilante Unmanned Aerial Vehicle (UAV) at Yuma Proving Grounds, Ariz. while under airborne control of a manned UH-I helicopter. The Vigilante can be seen in the lower right corner. (U.S. Army photo by Ronald Bowman)

FORT EUSTIS, Va.--The Aviation Applied Technology Directorate, Fort Eustis, Va., successfully fired four 2.75-inch rockets from the test bed Vigilante Unmanned Aerial Vehicle (UAV) on Dec. 13-14 at Yuma Proving Grounds, Ariz.

Data from the Vigilante indicates that the UAV remained stable and the flight control system attained the corrections to accommodate for the weapon recoil and blast effects. These events represent three major milestones for Army aviation.

Number one, this was the first known successful rocket launch from a rotary wing UAV. Secondly, the Vigilante was under airborne control, i.e., the control station for the Vigilante was installed in a UH-1 manned helicopter. Thirdly, this was the first airborne launch from the Hydra Universal Rail Launcher (HURL). The HURL is a 4-tube smart rocket launcher that attaches to the hellfire rail and connects with the platform through Mil-Std-1760 and Mil-Std-1553 interfaces. The initial HURL development was sponsored by the Comanche program.

These events open the door to revolutionary manned-unmanned teaming CONOPS that could fundamentally alter the tactics for future air campaigns. The launch of the un-guided rockets is a precursor to future activities to launch the guided Advanced Precision Kill Weapon System (APKWS) from a rotary wing UAV.

To prepare for this test, the Vigilante UAV, designed by Advanced Technologies Inc. with a flight control system developed by Science Applications International Corporation, was configured with an L3 (WESCAM Division) 12DS E0/IR sensor, and a 4-tube HURL 2.75-Inch rocket launcher developed by the U.S. Army Aviation and Missile Research, Development and Engineering Center Structures Directorate with a Stores Management System and Launcher Electronics Assembly developed by NAVSEA.

(Submitted by U.S. Army Aviation Applied Technology Directorate)

Army Adopts NASCAR Technology For Helicopters

By Stefanie A. Gardin
Army News Service

UH-60 Black Hawk Mylar durability desert testing. (Photo by Nate Bordick, U.S. Army Aviation Applied Technology Directorate.)

WASHINGTON– NASCAR windshield tear-offs will soon provide Army helicopters an extra layer of protection from sand, rocks and debris thanks to two National Guard Soldiers.

Sgt. 1st Class Paul Kagi and Sgt. Michael Mullen, Virginia Army Guard helicopter mechanics, submitted the idea to use windshield tear-offs to the Army Suggestion Program after discussing the idea at a Christmas party five years ago.

Their unit went to the National Training Center, Fort Irwin, Calif., with brand new helicopters. However, when they came back, they had to replace about 80 percent of the windshields due to sand damage.

“Sand will eat up a glass window. It gets so pitted you can’t even see out of it,” said Kagi, “that’s where Sgt. Mullen got the idea. He said, hey, they put tear-offs on racecars at Daytona and Texas for that very reason—to protect them from sand and debris.”

Kagi did some homework, researching tangible cost savings for the tear-offs, and the idea was submitted through the Army Suggestion Program channels for evaluation. Eventually, the aviation team at the Aviation and Missile Research Development & Engineering Center, Redstone Arsenal, Ala., together with the Defense Logistics Agency, picked up the idea and funded all the testing.

CH-47 Chinook Mylar Durability Desert Testing. (Photo by Nate Bordick, U.S. Army Aviation Applied Technology Directorate.)

“In order to put anything on a helicopter, we have to do a lot of testing on it because if a helicopter doesn’t work, it crashes—and that’s bad news,” said Doug Felker, Reliability, Availability and Maintainability team leader at AMRDEC.

Felker and team put the windshield tear-offs through a series of environmental testing and visibility testing, with the naked eye and night vision goggles. They also flight-tested the tear-offs on an aircraft in California in a brownout condition, where the aircraft purposely flies into a dust and sand environment, said Ken Bowie, RAM team member.

“The material has met or exceeded our expectations on all the tests at this point,” said Bowie, “that is how we got our airworthiness release.”

An Army airworthiness release is similar to its civilian counterpart, FAA approval. Any aircraft modifications must have this release before going into effect. So far, the RAM team has received approval for a single-layer tear-off sheet for the Black Hawk only, but it is working to get approval for the other aviation platforms: the Kiowa, Apache and Chinook, as well.

“Tear-offs are simple solutions to a tactical problem,” said Bowie. “The problem is operating in a sandy, dusty environment.”

The tear-offs are clear pieces of Mylar seven millimeters thick that are molded to the shape of the windshield. Mylar has all of the optical qualities of regular glass, and even stands up to abrasions better than glass because it has more give to it.

The point of the tear-off is that if there are incidences where a windshield gets pitted or dinged up, the damage is on the Mylar, not the windshield. Instead of replacing the windshield, which is timely and costly, the Mylar can be torn off, and the aircraft can move on.

"We want the Mylar to fail," said Felker. "As long as the Mylar receives all of the damage, the windshield's life is prolonged. Right now there is an acute shortage of windshields, and those windshields aren't cheap."

Current predictions estimate the life of one tear-off to be about six months. As long as the tear-off is not hit by something it won't handle, like bullets, and a fresh piece of Mylar is kept on it, the windshield should last forever, said Bowie.

"Tear-offs will save the Army repair, increase readiness, and save a great deal of money in both material and maintenance costs," said Felker.

Steve Fricker, from United Protective Technologies, Installing Mylar Tear-Off Windshield Cover on CH-47 Chinook at AATD, Fort Eustis, Va. (Photo by Nate Bordick, U.S. Army Aviation Applied Technology Directorate.)

Other contributors to the funding, research and fielding of the tear-offs have been the Defense Logistics Agency, Richmond, Va., the Black Hawk Project Office, Huntsville, Ala., and the Aviation Applied Technology Directorate, Fort Eustis, Va. Installation of the tear-offs on Black Hawks in Iraq and Kuwait is slated to start the first or second week in February.

"The goal is to improve things for our peers," said Kagi. "With helicopters, we operate and fight battles all over the world, and if we can get the word out or suggest something that is for the good of Army Aviation, then that is what we want to do."

Cash awards are paid for ideas adopted that were submitted through the Army Suggestion Program. The amount is based on tangible cost savings with a maximum award of $25,000.

UH-60 Black Hawk Mylar Installed on Left Windshield. (Photo by Nate Bordick, U.S. Army Aviation Applied Technology Directorate.)

Project Aims To Clean, Recycle Dirty Dish Water

U.S. Army Soldier Systems Center

NATICK, Mass. -- Dump it on the ground or haul it away. Water sullied by food and soap from washing dishes in field kitchen sanitation sinks never had another chance until the Greywater Remediation and Recycling project started two years ago.

Cleaned and reused, the Army figures on cutting potable water consumption and the amount of greywater backhauling by two-thirds. With an estimated annual 20 million gallons of water now used nationwide for field sanitation, the Army also can expect to save money.

"It all goes back to the need for the Army to reduce logistics," said Chad Haering, a chemical engineer on the Equipment and Energy Technology Team at the Department of Defense Combat Feeding Directorate at the U.S. Army Soldier Systems Center here. "(Water) is the heaviest commodity they have and extremely hard and expensive to move, and we know from Iraq, can be dangerous to transport. Reducing the demand for the use of water is going to reduce the Army logistics footprint."

Other benefits are a healthier environment because food particles and stagnating water attract pests and spread disease, and less work for the kitchen crew since digging a grease trap for greywater is complicated, according to Haering.

Pots, pans, utensils and other dishes are washed, rinsed and sanitized in the field with a three-sink food sanitation center that consumes nearly 250 gallons of potable water daily. Wastewater is either poured onto the ground, or stored in a tank or bladder for disposal.

The team is working with two technologies on the commercial market that have for decades been used for industrial applications, such as ultra-filtration for car washes, but only in recent years been manufactured small and lightweight enough to be practical for the military, according to Haering.

"The standards now are that only potable water be used for washing and rinsing, but as soon as you start washing, the water gets dirty. If you can continue to wash dishes in slightly dirty water, you can use this reclaimed water," Haering said. "It's good enough for washing and rinsing, but the sanitation sink would still use potable water to not compromise safety."

Greywater remediation and recycling is also finding a home in a future field kitchen. Connected to Combat Feeding's developmental Field Feeding Advanced Sustainment Technology kitchen, a steam-powered greywater recovery system from Advanced Mechanical Technologies Inc. (AMTI) distills water to remove contaminants.

AMTI's unit slides underneath the sink and can be disconnected so it can be packed for transit. Its 10-12 gallon per hour flow rate is slower than desired, but the sanitation center's water demand may be lower to meet the requirement of between-meal remediation, said Tony Patti, a mechanical engineer on the Equipment and Energy Technology Team.

With the initial phase finished, the team will continue with a one-year effort if additional funding from the Environmental Security Technology Certification Program is approved, said Haering.

(Submitted by U.S. Army Soldier Systems Center Public Affairs Office)

Ramps Speed Chinook Deliveries

U.S. Army Soldier Systems Center

NATICK, Mass. -- Bad enough spending time and effort muscling a loaded pallet of supplies off a CH-47 helicopter, cargo often got banged up when it tripped and tumbled out the door.

Help is on the way. A request for off-loading equipment last summer by a member of the Army's Rapid Equipping Force operating in Southwest Asia eventually led to the Aerial Delivery and Engineering Support Team at the U.S. Army Soldier Systems Center here, developing a field-expedient fix within 90 days.

Commercially-available conveyor rollers along with wooden ramp extensions, complementing existing off-load extensions, provide a quick, easy and inexpensive way to move out cargo without sacrificing troop transit, said Bob Pitts, an equipment specialist and project officer for the CH-47 Rapid Off-Load. "Everybody down there said 'I wish I would have had this when I was there,'" Pitts said about the pilots, crew chiefs and flight engineers with combat experience in Afghanistan and Iraq taking part in an evaluation at Fort Campbell, Ky. After the evaluation, 120 roller systems were sent to Southwest Asia, with another order of 60 on the way.

Since the 1960s, the CH-47 Chinook helicopter has delivered troops and equipment to almost any type of terrain. They have been flown for airborne missions, casualty evacuation, downed aircraft recovery, disaster relief, and search and rescue missions during war and peace, according to Pitts. He said flying cargo externally with a sling load is an option with the CH-47, but crews don't prefer it because extra drag reduces speed and increases fuel consumption, and because of the type of flying they do.

To keep it inside, the Helicopter Internal Cargo Handling System (HICHS) has been available for more than a decade. The system provides low-friction loading and unloading conveyor ramps along with conveyors for moving cargo within the aircraft.

"It's a good system for the loads that it is designed for, but it has drawbacks," Pitts said. "HICHS was not in there most of the time. Once configured, you want to leave it that way because it's difficult and time-consuming to install. The 463L pallet is too big to move around, and it doesn't allow any space to carry troops." It also has limited availability, with the HICHS allocated to one-fourth of the Chinook fleet. Operations in Afghanistan and Iraq renewed interest in internal cargo delivery and spurred field improvisation with locally-built "kick pallets," according to Pitts, which still allow room for passengers.

Kick pallets are double the length of the industry-standard warehouse pallet but half the size of the costlier 463L pallet. They often became snagged inside the helicopter and sometimes had to be pushed out as the helicopter took off, he said. Increased time in landing zones increased risk of enemy fire and tipped over pallets resulted in damaged supplies.

On the other hand, kick pallets placed in the center freed 20 passenger spaces on each side, keeping troops and their supplies together.

The Aerial Delivery and Engineering Support Team worked with packaging and materiel experts as well as CH-47 crew members to shape the requirements and design concepts leading to a system working with both kick pallets and warehouse pallets.

It met the criteria of allowing up to four pallets to be unloaded within 10 minutes, clearing the ramp area by 30 feet, giving enough pallet clearance without having to taxi the helicopter forward and working on any type of terrain. Chinooks with the new system can be configured to carry all cargo or a combination of passengers and cargo.

"We did nothing that modifies the aircraft at all. It's compatible with the armor protection," Pitts said. "We still get the same volumetric capacity as before without losing troop carrying capacity using rollers and pallets you can get anywhere."

The rollers, which could be wide or the thin skate-wheel variety, are ladder-shaped and strap down onto the cabin floor. When it's time to exit, the rollers are extended into place along with the wooden wedges slid underneath to support the weight as pallets move down the line.

Chances of a spilled pallet are lowered, and extra wood planks underneath the rollers help reduce friction when a pallet is pushed or pulled along the rollers. Pitts said changes ahead might include adding a smooth surface underneath the pallets for extra stability on the rollers and developing a roller system based on the warehouse pallet.

A roller system using warehouse or kick pallets could also be added to light tactical vehicles, such as the Humvee, he said. With stick on cardboard honeycomb affixed to the side, it's possible to drop pallets directly from the rear of any vehicle or a helicopter.

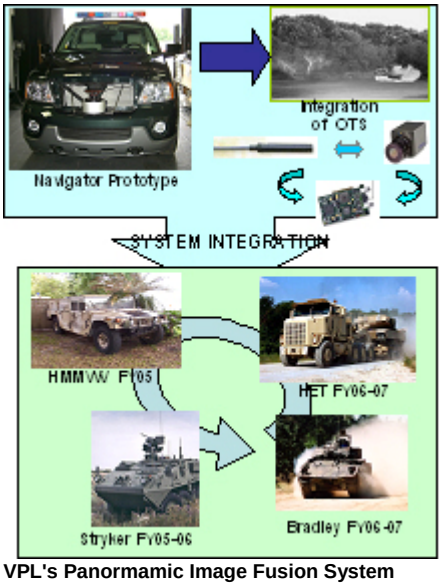
(Submitted by U.S. Army Soldier Systems Center Public Affairs Office)

Survivability Takes The Lead At The 2004 Army Science Conference

By Jennifer Gillis and Dr. Thomas Meitzler
U.S. Army Tank Automotive Research, Development and Engineering Center

WARREN, Mich.--The survivability department of the Tank Automotive Research, Development and Engineering Center of the U.S. Army Research, Development and Engineering Command recently demonstrated their technologies at the 24th Army Science Conference in Orlando, Fla.

TARDEC, located in Warren, Mich., is the heart of science and technology research for ground systems to support our warfighters. The majority of research is executed by the survivability branch, lead by Steven Schehr, associate director. He manages seven teams that focus on visual perception, technology, reduction of vehicle damage, emerging technology, sensors, and future combat systems (FCS) support. Reflecting back on the ASC and the questions directed to him concerning his role in future Army technology, Schehr said, “I discussed non-traditional survivability methods that can be used to supplement traditional future force survivability programs to solve near term problems. I showed three examples of non traditional survivability, one in the active protection area, one in the armor area, and one for tactical vehicle crew protection.”



VPL's Panormamic Image Fusion System Integration.

With the help Schehr and his fellow team leaders, the survivability department researches, tests, and fields many life-saving technologies, beginning with the visual perception laboratory (VPL). The VPL’s mission is to use photo simulation to evaluate stealth technology designs for the non-traditional survivability of ground vehicles. At last year’s ASC, they exhibited a poster paper entitled, “Threat and Battlefield Damage Assessment Using 3D Imaging and Sensor Fusion.”

The VPL also works on a variety of projects with the NASA-Kennedy Space Center, Columbia Medical Center and Ford Motor Company. They are currently researching ice detection methods for NASA to support the next space shuttle launch this spring. The research with Columbia Medical Center in New York is with functional magnetic resonance imaging (fMRI) technology to study the increase of blood flow by stimulated brain activity due to cognitive functions.

With the expertise of the VPL team leader, Dr. Thomas Meitzler and his VPL engineers and scientists want to gain a better understanding of human visual perception of camouflaged vehicles. Since there is a greater need for homeland defense, the VPL also evaluates electro-optical systems for homeland defense and remote inspection and has the capabilities to measure electromagnetic signatures with a project based on 360 degree sensor fusion technology that will aid warfighters in surveillance, perimeter control at borders, in-country peace keeping operations and improve outside awareness. It is currently a kit mounted on a Ford Lincoln Navigator, but is being upgraded to be compact and mounted on Army ground vehicles.


V-BASS Version 3.0 on a M915 seat.

Another element of survivability is Emerging Technologies, lead by Dr. Doug Templeton, which generates advanced technological ideas and tools useful for future application to ground combat vehicles and survivability. Emerging Technologies’ scientists and engineers have teamed up with Army Research Laboratory (ARL) to enhance Electro Magnetic Armor (EMA) to increase the survivability of warfighters. The EMA is mounted to the exterior of the vehicle over the baseline armor and connected to the vehicle’s electric power system. Electro Magnetic Armor consists of a charged and neutral plate of armor, but between them is where the engineering lies. The electrical circuit is complete when the round strikes the system.

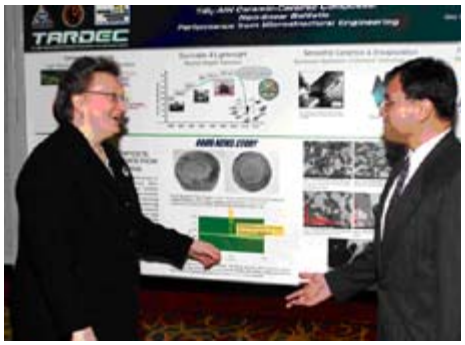
The benefits of EMA are that it is extremely lightweight when compared to traditional passive and reactive armors, easier to handle, but more importantly it does not propel plates/fragments from vehicle like reactive armor and hard kill systems.

A recent fielded vehicle part called the Vehicle Body Armor Support System (V-BASS), is constructed by Michael Clauson of the Survivability's Emerging Technology Team. In August 2003, the commanding general of the Army Material Command assigned RDECOM the task of investigating the current capabilities of lightweight tactical vehicles defeating RPGs, small arms, and IED's. To solve this problem, this survivability kit was designed as part of the vehicle to provide protection to soldiers in unarmored vehicles. Currently, 112 kits have been shipped and are currently being used by warfighters in Iraq.

Thomas H. Killion, deputy assistant secretary of the Army for Research and Technology, has recognized Michael Clauson, Capt. Gregory Hetzel and Michael Manceor for their work by receiving U.S. Army Materiel Command's 2004 Army Research and Development Achievement Award. Hetzel and Manceor are the leads on Armor Survivability Kits for the Army's High-Mobility Multipurpose Wheeled Vehicle.

The last leadership award at the ASC went to the team leader of technology research, Charles Acir. He has been a mechanical engineer for 9 years in survivability. Acir's leadership skills have been recognized because of his recent successful non-traditional ground combat vehicle protection system in the world called the Integrated Army Active Protection System (IAAPS). An additional technology research booth at the ASC featured full-spectrum active protection close-in layered shield, also known as FCLAS. This is an anti-missile missile in a cylinder that will soon be integrated on the ASK HMMWV by the next fiscal year.

Finally, another survivability mechanical engineer, Lisa Prokurat-Franks, who has been working in survivability for four years, co-authored a paper for the ASC entitled "TiB2 – AIN Ceramic-Ceramic Composite: Non-linear Ballistic Performance from Microstructural Engineering." Her recent studies in armor ceramics demonstrated the effectiveness of confinement and/or constraint in enhancing ballistic performance.



Lisa Prokurat-Franks discussing her poster paper with an Army employee.

TARDEC Develops Soldier Life-Saving M939 Solutions

By Ashley John
U.S. Army Tank-Automotive Research, Development and Engineering Center


The M939 add-on armor kit.

WARREN, Mich.--The U.S. Army Tank-Automotive Research, Development and Engineering Center (TARDEC) has once again highlighted the ability to quickly respond and develop truck armor kits to enhance Soldier survivability. Reacting to a needs statement provided from Central Command (CENTCOM) in regard to truck drivers in Iraq and Afghanistan needing better protection against small arms fire and Improvised Explosive Devices (IEDs), TARDEC rapidly developed another life-saving solution for the Soldier. According to the Armor Test Center at Aberdeen Proving Grounds, Md., the M939 add-on armor kit is the best ballistic armored cab that has been implemented to date.

To start, Program Manager – Tactical Vehicles (PM-TV) defined protection parameters to be that of the HMMWV Armor Survivability Kit, a successful TARDEC and Army Research Laboratory collaboration that greatly amplified Soldier safety. Taking this solution only as a guide, TARDEC began to find a solution for the larger M939 series of vehicles. TARDEC had to keep in mind that Operation Iraqi Freedom (OIF) M939 kits would face ballistic threats that could greatly surpass any current add-on armor kit.

CENTCOM also identified additional requirements for the M939 Crew Protection Kits. Additions consisted of a movable side window for ventilation and firing purposes, a gun ring, a weapons platform, a digital rack and a cab air conditioning unit which all needed to support the M939 basic, A1 and A2 family of vehicles. Furthermore, TARDEC added a structural requirement that would minister roof protection to Soldiers.

TARDEC's Emerging Technologies Team originated armor designs beginning in March 2004 According to Terry Avery, TARDEC project manager, "This was and continues to be an all-out effort that has no margin for error. Every delay or mistake results in potential causalities to our troops. There's no greater motivation than to have the ability to provide life-saving equipment."

TARDEC considered numerous armor material combinations keeping with aspirations to optimize materials and reduce unnecessary weight that may be added to the vehicle. Armor materials that were readily available and windshield transparency materials were given the highest priority enabling TARDEC to speed up development and reduce costs. Fabrication of an initial prototype kit began just prior to Memorial Day 2004.

Crew Protection was the most vital requirement for the armor kits. TARDEC engineers developed and manufactured an entire new cab from the roof to the floor and from door to door. The final M939 Crew Protection armor kit consisted of an armored cab, fire wall protection, floor/fender mine protection, a weapons station and an air conditioning unit. To maximize Soldier safety, TARDEC planted contoured armor plates under the M939 hood and inside the dashboard to reduce the threat of small arms fire through the frontal hood region. Decreasing the threat of fragments from land explosives, TARDEC engineers mounted armor plates inside the floor of the cab and under the front wheels.

TARDEC engineers also fitted the armored cab's roof with the weapons station that is used on the HMMWV, permitting Soldiers to mount required weapon platforms. Capitalizing on Soldier comfort and to make additional room for the air conditioning unit, TARDEC installed two new air ride seats for the vehicle crew. Rationale behind the new seats also fostered from requests to have better adjustments and increased platform protection, both of which the new seat adhered too.

Adding additional armor to the vehicle dramatically increased the need of an air cooling system to reduce crew stress. To provide a cooling solution for the Soldier, TARDEC collaborated with Red Dot Corporation, a Seattle, Washington based corporation to modify the existing HMMWV air conditioning unit to fit the M939 vehicles. By adopting the commonalities between the HMMWV and the M939 vehicle systems, TARDEC and Red Dot were able to simplify the number of parts and repair procedures required to implement the air conditioning system into the M939. Within two weeks of inception, a functional air conditioning system was installed into the M939 vehicle system.

By June 2004, TARDEC assembled and installed the armor kit and the air condition system into the M939 vehicle. Two kits were then sent to Aberdeen Test Center (ATC) to under go automotive, human factor and ballistic testing. One of the kits became the “ballistic turret and hull” for live fire testing against standard Operation Iraqi Freedom (OIF) threats. Major testing culminated in October 2004, however subsequent testing and minor adjustments are continuing.

The intense effort displayed by TARDEC to rapidly produce and deploy an add-on armor kit for enhanced crew protection to the M939 series of vehicles, demonstrates TARDEC’s active participation in supporting the Warfighter. Currently, the M939 armor kit provides the highest level of protection of any of the tactical vehicle armor kits that have been tested.

Currently, TARDEC is working to produce three kits to be sent into theater. In mid-December 2004, the first light-weight M939 kit was deployed to Kuwait for training, installation and operational procedures. By late December, a heavy-weight kit was shipped to Kuwait to undergo the same procedures. TARDEC and partners are currently preparing one more kit to be sent to Soldiers that will ensure simple installation for all M939 variants.

GSIE initiated production of the M939 kits during January, producing 20 kits by the end of the month. GSIE has been working with TARDEC and all other depots on this task since May 2004. TARDEC has provided them with numerous long-lead-item lists, from which they need to procure. GSIE and all depots have been rapidly adjusting the kits to ensure that they will provide the utmost protection for the Soldier.

Hovercraft on Wheels Takes a Trip to the HillEdgewood Chemical Biological Center

By Ashley John
U.S. Army Tank-Automotive Research, Development and Engineering Center


ODIS under a vehicle to view cavities and wheel wells in support of U.S. forces operating in Iraq.

WARREN, Mich.--With the Global War on Terrorism growing increasingly prevalent to U.S. citizens, the Omni-Directional Inspection System (ODIS) has taken a stab to continually defend homeland security. Developed by the U.S. Tank-Automotive Research, Development and Engineering Center (TARDEC), headquartered at the Detroit Arsenal in Warren, Mich., ODIS is a robot system that aids in the detection of bombs and other explosive devices that terrorists may try to smuggle into United States and abroad.

ODIS is a robotic delivery platform capable of mounting many different sensor platforms. Currently, ODIS is equipped with a visual camera and active lighting forming the basic mission package. Acting like a hovercraft on wheels, ODIS can move forward or backward, left or right and rotate separately or in combination. This feature allows the operator to precisely position and maneuver ODIS under a vehicle to view cavities, wheel wells and spaces above and around structural members.

A one-of-a-kind design, ODIS is fashioned to provide seamless vehicle inspection while aiding unfamiliar users with a clear display to understand the underside of a vehicle. False exhausts or out of place wires can effortlessly be identified with minimal operational training. The ODIS robots have the additional capability of being equipped with other sensor packages including radiation detectors and Chemical / Biological detectors.

Most recently, ODIS has taken a venture to Capitol Hill with the aid of Michigan Senator, Debbie Stabenow. In mid-August 2004 ODIS was loaned to the Capitol Police Bomb Squad Hazardous Materials Unit in Washington, D.C. Henry Andrusz, Project Manager for ODIS, was sent to the site to train officers on how ODIS operates. The new ODIS operators were so extremely impressed with ODIS's capabilities that they informed other officers working in secure government buildings of the technologies and usefulness behind this system. During its visit, ODIS is primarily working with the Hazardous Devices Unit to perform reconnaissance on vehicles and other suspicious objects.

Concurrently, ODIS is also being operated by the Center of International Trade in Long Beach, Calif., where approximately 30 percent of all U.S. imports travel. Dr. Larry Mellon, from the University of Southern California, is conducting experiments on the effectiveness of ODIS in the major port. A series of evaluations are also planned with port authorities, the U.S. Marine Corps and the U.S. Army Stryker Brigade's current deployed units to see how ODIS can improve security at military and commercial marine cargo facilities.

While some ODIS units are protecting the homeland, many more are deployed overseas. The daily presence of suicide bombings and vehicle explosions in Iraq and Afghanistan has placed an increased emphasis on keeping the Soldier as far away from vehicles as possible. A camera mast system was developed to allow the operator to see inside the vehicle while operating from a remote location. The system also offers the ability to have a palm-computer based translator system that allows ODIS to interact with personnel for identification verification and to relay instructions to the vehicle drivers and passengers.

In an effort to support Operation Iraqi Freedom and Operation Enduring Freedom, ODIS has been successfully deployed to U.S. Soldiers currently stationed in Iraq and Afghanistan. According To Bill Smuda, chief engineer at TARDEC, who fielded 20 robots in

Iraq and Afghanistan while there on a 60-day deployment, “The soldiers really liked the technology, and were very quick to pick up the use of it.” Feedback from Soldiers in Iraq has lead to the development of additional payloads to assist in stand-off efforts. Six additional ODIS prototype units are ready for deployment at TARDEC’s Robotic Mobility Lab, and are awaiting detail from the Rapid Equipping Force (REF).

Officers and technicians at the Capital Police Hazardous Devices unit have trained with the robots for about two weeks, and according to Andrusz they, “really think it’s a valuable tool for their job.” California Highway Patrol units working with the robot in Long Beach say they feel the value of the robot because it keeps them out from under the trucks. ODIS has evolved into an increasingly valuable tool for homeland security and the Global War on Terror. ODIS’s journey has just begun and it will continue to thrive with a mission to ensure that our Soldiers and citizens remain safe and alive.

ECBC Drafts Program Plan for the Marine Corps By Ashley John

U.S. Army Edgewood Chemical Biological Center

EDGEWOOD, Md.--ECBC has drafted a program plan for the development of a regenerative nuclear, biological and chemical (NBC) filtration system for the U.S. Marine Corps Expeditionary Fighting Vehicle program, the successor to the Advanced Amphibious Assault Vehicle program.

Current single-pass activated carbon-based systems present a logistical burden due to frequent filter change-out requirements. This burden, combined with the added requirement to protect against Toxic Industrial Chemicals (TICs), are shortcomings for the successful fielding and deployment of an agile and rapidly mobile force. Regenerative filtration can provide continuous and full protection from multiple exposures to Chemical Warfare Agents and TICs.

Since no pre- or post-attack filter change-out is required, the current logistical burden would be significantly reduced. Once the plan is approved, ECBC will manage the congressionally-funded program.

(Submitted by U.S. Army Edgewood Chemical Biological Center Public Affairs Office)

ECBC has drafted a program plan for the development of a regenerative nuclear, biological and chemical (NBC) filtration system for the U.S. Marine Corps Expeditionary Fighting Vehicle program.

ECBC to Test Unique Forensic System Being Sent to Aid In Tsunami Disaster

U.S. Army Edgewood Chemical Biological Center

EDGEWOOD, Md.--Edgewood Chemical Biological Center (ECBC) has begun testing on the BioSeal Facility SystemTM, developed by San Diego-based Barrier Products, LLC. While this system is being tested for its homeland security applications to contain the bodies of victims of a chemical agent attack, it is being rushed by the manufacturer to Thailand to assist emergency response authorities in dealing with the thousands of dead as a result of the recent tsunami. ECBC will be testing the material to evaluate its impermeability to chemical and biological agents.

BioSeal utilizes a proprietary, poly-aluminum foil-extruded, Dupont Tyvek laminate material that, the manufacturer claims, when used with a heat sealer, contains all odors, vapors, gases and fluids of the contents. This is critical in the event of a chemical weapons attack, since first responders may not know which specific agent they are dealing with, yet they need to be assured that any residual chemical material does not migrate from a deceased victim to any emergency responders or to the public.

(Submitted by U.S. Army Edgewood Chemical Biological Center Public Affairs Office)

ECBC is testing the BioSeal Facility System. The manufacturers are sending BioSeal to Thailand to help local emergency officials cope with the aftermath of the recent tsunami. (Photo courtesy of Barrier Products, LLC.).

Missouri National Guard Aviators Recognize Two at AMRDEC\

U.S. Army Aviation and Missile Research, Development and Engineering Center

Capt. R.J. Mikesh (right), a research, development, and integration officer at the Aviation and Missile Research, Development, and Engineering Center, Redstone Arsenal, Ala., explains to Lt. Col. Kevin Robinson, an Army National Guard aviator just returned from a one-year deployment in Kuwait, what is being done at the Army's Alabama research center to improve Blue Force Tracking.

REDSTONE ARSENAL, Ala.--A Soldier and a contract employee at the Aviation and Missile Research, Engineering, and Development Center (AMRDEC) were singled out for excellence by Army National Guardsmen during a brief ceremony at Redstone Arsenal in Huntsville, Ala., last month.

Capt. R.J. Mikesh and Ana Trammell from AMRDEC's Prototype Integration Facility (PIF), were honored by Soldiers of the 1107th AVCRAD, or Aviation Classification Repair Activity Depot, from Springfield, Mo.

According to Lt. Col. Kevin Robinson, the depot's executive officer, the trip to Huntsville was one of the first things the unit's Soldiers did after returning from duty following a year-long deployment to Camp Arifjan, Kuwait.

"The question keeps coming up: 'What can we do for that Soldier?'" Robinson asked. "Well, thanks to R.J. and Ana, we have answered that question in terms of $18.7 million in first-line, up-front equipment that now permits Soldiers to perform depot-level repairs as far forward as possible."

Mikesh, a 10-year Army veteran who graduated as a mechanical engineer from Clarkson University where he was also a Distinguished Military Graduate of the Army ROTC program there, is currently a research, development, and integration officer at the PIF.

For supporting Soldiers deployed to Kuwait to perform maintenance on helicopters, members of a Missouri National Guard unit presented a helicopter tail rotor to Capt. R.J. Mikesh and a plaque to Ana Trammell, both of whom work at the Aviation and Missile Research, Development, and Engineering Center at Redstone Arsenal, Ala.

Mikesh is scheduled to stay at Redstone Arsenal for another year. He has also been a recruiting company commander in Everett, Wash, an aviation company commander at Camp Stanley, Korea, and an aviator at Hunter Army Airfield, Ga.

Trammell is Chief of Procurement for the CH-47 Chinook helicopter team at the PIF. She is a Department of Defense contract employee with Science and Engineering Services, Inc., and is part of a joint venture between SES and Yulista known locally by the acronym JVYS. Much of Trammell's day-to-day activities are in support of the Program Executive Office for the Chinook helicopter.

The Missouri National Guard unit replaced a similar unit from Connecticut in Kuwait. Once there, the Soldiers realized they needed, quickly, large quantities of unique materiel and aviation maintenance peculiar equipment. According to Danny Featherston, the "PIF is a government-owned and government-operated facility within the Aviation and Missile Research, Development, and Engineering Center.

"Our mission is to serve the Soldier by solving technical problems through the use of rapid acquisition, development, prototyping, manufacturing, integration and fielding," said Featherston, the PIF's acting program manager.

“By pushing that equipment forward to warfighters, we are truly living up to our motto: ‘Semper Volans – Always flying,’” Robinson explained.

The PIF duo worked to fabricate, procure, and package tooling and test equipment to support AMCOM’s Theater Aviation Maintenance Program resulting in bulk shipments being sent to Camp Arifjan for Operation Iraqi Freedom.

“What you all have done here at the PIF, is very important to supporting the war effort,” Robinson said. “We can’t thank all of you enough for putting in the long hours to make things happen.”

“We know that this equipment needs to get to the Soldiers over there,” Mikesh replied. “We’re here to support you all.”

Featherston said after the ceremony, “We were delighted to host the ceremony and very thankful of Lt. Col. Robinson. He and his staff displayed genuine gratitude and their gesture was truly inspirational.

“Along with recognizing the outstanding performance of Capt. Mikesh and Ana Trammell, Lt. Col. Robinson’s actions reaffirmed the importance of our mission. We serve the Soldier and having Soldiers recognize these individuals is a tribute to the determination and talent of our entire staff.”

According to Trammell, “I love my job! I love the Soldiers who protect me and my country.”

Trammell’s love of her work, and of Soldiers every where was instilled in her from the very beginning. Her father is a retired Army warrant officer. The Trammell family was posted at Redstone for one assignment and the younger Trammell was born on post.

“It feels very good to know you are helping the ones out who are fighting for our country. I have become very dedicated to this project and some what emotional to the devotion the Soldiers are giving in maintenance of AOG's (aircraft on the ground). While we are here, able to relax on weekends, working our five-days-a-week jobs they are working non-stop hours,” she said.

(Submitted by U.S. Army Aviation and Missile Research, Development and Engineering Center Public Affairs Office)

Employees Sponsor Holiday Families

By Holly Costanzi
U.S. Army Materiel Systems Analysis Activity

Joe Wurm, left, Ordnance Corps Association associate director, delivers holiday gifts donated by the association to Spc. Jeffrey Johnson, right, Headquarters Support Troop, his wife, Adoru and daughter, Jordyn. (Photo by Yvonne Johnson, APG News)

ABERDEEN PROVING GROUND, Md.--Every year the U.S. Army Materiel Systems Analysis Activity (AMSAA) sponsors both military and civilian families for the holidays. This year the organization helped eleven families in need, consisting of 27 children and 18 adults. Each family was provided toys, clothing, a nice holiday dinner and enough food to last the week between Christmas and New Year's. David Shaffer, director of AMSAA, strongly supports this effort of giving back to our military families and local neighbors in need.

Year after year, the generous support of the AMSAA community has made this effort successful. This year alone over $4,500 in contributions were made to the holiday fund by employees of AMSAA. Special mention goes to Chief Warrant Officer 5 Robert J. Wurm (retired), an employee of AMSAA and a member of the U.S. Army Ordnance Corps, who arranged an additional $1,000 donation from the Ordnance Corps to help our military families.

In addition to monetary donations, AMSAA also collected cleaning supplies, personal hygiene items, and non-perishable food. Many items collected contribute to each families holiday dinner, which would not be complete without the main course. Every year, Arthur Garrett of the Armor and Infantry Branch purchases each family a turkey or ham for their holiday dinner.

Other events throughout the year also contribute to the success of our Holiday Families. Profits from the sale of "strings and mulligans" at the spring golf scramble and "closest to the pin" at the Organizational Day Picnic are donated to the holiday families. The Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance – Mobility Branch also makes a yearly donation to the families. This year's contribution totaled $1,000.

As the deliveries were made it was evident that all the families were extremely grateful for our help. Seeing their faces and knowing that the children would have a wonderful holiday, made it all worth the effort. AMSAA could not have had this success without the generous donations of its employees and the selfless efforts of the holiday family committee members. Shaffer said, "I am sure this made the holidays better for all of the families involved. This was a superb effort and makes me proud to be a part of this organization."

Senior Research Biologist Receives U.S. Army R&D Achievement Award

U.S. Army Edgewood Chemical Biological Center

Dr. Vipin Rastogi, senior research biologist with the U.S. Army Edgewood Chemical Biological Center, and recipient of the U.S. Army Research and Development Achievement Award.

EDGEWOOD, Md.--Dr. Vipin Rastogi, senior research biologist with the Edgewood Chemical Biological Center, has received the U.S. Army Research and Development Achievement Award in recognition of his exceptional scientific achievements in the invention of catalytic chemical warfare agent-neutralizing enzymes and the development of biological warfare agent probes and assays.

The enzymes are designed to render chemical weapons benign, and the probes and assays are designed to improve Anthrax detection capabilities. These contributions constitute extraordinary scientific breakthroughs in chemical and biological defense and have provided the military and civilian communities with state-of-the-art technology in their efforts to counter chemical and biological threats.

(Submitted by U.S. Army Edgewood Chemical Biological Center Public Affairs Office)

Soldiers Play Santa For Area Children

Night Vision and Electronic Sensors Directorate

Staff Sgt. Jerry Cockrell shares a moment with one of the children.

FORT BELVOIR, Va.--For many children, Christmas is the happiest time of year. They write their lists for Santa, decorate the Christmas tree with their family, and on Christmas morning they awaken to a pile of presents left by the jolly old man himself. But for those children who are less fortunate, Christmas can be a very sad and lonely time.

The Soldiers of the Research, Development and Engineering Command (RDECOM) Communications-Electronics Research, Development and Engineering Center's (CERDEC's) Night Vision and Electronic Sensors Directorate (NVESD) wanted to do something to make Christmas merry for the area's needy children, so they decided to host a holiday party at NVESD. The event was organized by Sgt. 1st Class Larry Jones and supported by Maj. Teresa Starks, Sgt. 1st Class John Miller, Sgt. 1st Class Ricardo Rivera, Staff Sgt. Greg Wright, Staff Sgt. Gerald Canada, Staff Sgt. Jerry Cockrell, Sgt. Patrick Blevins, and Sgt. Sidney Jolley. Col. Ed McCoy greeted the children and gave a brief overview of NVESD on the day of the party.

Jones, who is a member of Big Brothers, Big Sisters in Washington, D.C., and the other military personnel wanted to do something to reach out to the community, so the planning began. "When we first had this idea, it was initially supposed to be for military children in this area that had lost a relative in Operation Iraqi Freedom. But we had such a great response from thirteen area donors that we decided to open it up to an orphanage that needed some assistance," Jones said. The Soldiers received information about 20 or so children that were living at Covenant House, an orphanage and homeless shelter in southeast Washington, D.C., and the shopping and planning began.

All of the soldiers, dressed as Santa's elves, helped to serve the Christmas feast to the hungry and excited kids.

The Soldiers worked with various businesses throughout the community and received donations of food, clothing, and toys. They then approached the employees of NVESD, requesting more of the same. Pretty soon, offices were overflowing with gifts and the Soldiers were rarely seen without an armful of shopping bags or brightly wrapped packages. "It made me feel great seeing all the support from the individuals at Night Vision, civilian as well as military, during this event," Jones said with a smile.

The afternoon of the party, the wide-eyed kids filed silently into the lab, seemingly overwhelmed by the enthusiastic Soldiers in their Santa hats. But as soon as they entered the conference room and saw the brightly lit Christmas tree that was almost lost in a sea of packages they broke into smiles. The kids ran excitedly around a table covered with red stockings, each with a name of one of the children on it. Once everyone had found their stocking and looked at the gifts inside, the party continued with the Christmas feast. It was a buffet of every kid's favorite junk foods including pizza, fried chicken, and French fries, to name a few.

Their bellies full, they then played a few rounds of Christmas bingo, using chocolates for game pieces. But soon, rumors of Santa's arrival began to circulate and the room hummed with excitement. Before the children could finish a Christmas carol, the door opened and in walked Santa! There were screams of delight amongst the "Ho ho ho's!" as Santa greeted the children. They all quickly lined up to get a chance to sit on his knee and tell him what they wanted for Christmas.

For Staff Sgt. Greg Wright, this was one of the highlights of the day, “I think the best part of the party was when they got to sit on Santa’s lap. It looked like they really enjoyed it and it seemed like some of them had never done that before,” he said.

The children were even more surprised when Santa handed them a stack of gifts after they had their chat. Some of the piles were even taller than the kids. Both the kids, the parents and chaperones who brought them were shocked. The adults even shed a few tears as they watched the joy and happiness on the children’s faces as they opened their presents.

Sgt. 1st Class Rivera’s visit as Santa was the highlight of the day. All of the children gathered around him shouting their Christmas wishes and each took a turn on his lap.

When the last present had been opened, the pizza eaten, and Santa had made his exit, all that was left was a roomful of happy and tired children. The vans were loaded up with the presents and the kids waved goodbye to Santa’s elves. Jones deemed the event a success “because of the lasting moments we shared with the children. In setting out to do this our goal was to bring a little happiness to one person’s life this holiday season. I felt we went above this by bringing a lasting moment to twenty children. If anyone wanted to see one of the real reasons for Christmas, this was it,” he said.

(Submitted by Night Vision and Electronic Sensors Directorate)

Protecting Your Identity - Know Your Rights

EDGEWOOD, Md.--In recent years, there has been a virtual explosion of methods for collecting, storing, sharing and yes, even stealing your personal information. Because your credit file changes constantly, it's important that you review your information regularly to check its accuracy. Do you know what is on your credit report? Fact: One out of four credit reports contain serious erroneous information.

Under the new Federal Fair Credit Reporting Act (FCRA), each of the consumer reporting companies is required to provide you with a free copy of your credit report, at your request, once every 12 months. Consumers living in the eastern states will be eligible to order their free reports on Sept. 1, 2005.

Equifax, Experian and Trans Union have joined forces to offer a one-stop free credit report quickly via their secure internet site www.annualcreditreport.com . This site will allow you to request, view and print one, two or all three of your free credit reports at once. You may also request your credit report by calling their toll free number, 877-322-8228, or by completing the Annual Credit Report Request Form at www.ftc.gov/bcp/coline/edcams/credit/docs/fact_act_request_form.pdf and mailing it to: Annual Credit Report Request Service, P.O. Box 105281, Atlanta, GA 30348-5281.

The credit bureaus stress that this is the only service they have authorized for requesting your free annual report. Do not contact the three nationwide consumer reporting companies individually.

Can anyone see my credit report? Yes. Anyone with a "legitimate business need" can gain access to your credit history without your permission.

Can the information in your credit file be used for any other purposes? Yes. The practice of generating and selling lists for use in pre-approved credit and insurance offers is allowed by law. This is the source of the many pre-approved credit offers most of us receive in the mail. You can remove your name from the mailing list compiled by credit bureaus by calling opt-out at 888-567-8688 and following the instructions, or by writing directly to Mail Preference Service, Director Marketing Association, P.O. Box 643, Carmel, NY 10512 and the credit bureaus.

Be aware. Do not fall for companies or individuals that promise quick fixes and credit repair services for bad credit, most of these are almost always fraudulent. Protect your identity. A better alternative for help with re-establishing good credit is to contact an agency of the National Foundation for Consumer Credit (www.nfcc.org).

Remember, credit reports are a gold mine of information in the wrong hands. Protect your identity.

Important links:

Federal Trade Commission: www.ftc.gov
Consumers Union: www.consumersunion.org
Direct Marketing Association: www.the-dma.org
"OPT-OUT" letter: www.ftc.gov/privacy/cred-ltr.htm
Experian Credit Bureau: www.experian.com
Equifax Credit Bureau: www.equifax.com
Trans Union Credit Bureau: www.tuc.com

(Compiled by the U.S. Army Research, Development and Engineering Command Antiterrorism, Law Enforcement and Physical Security Team)

Distributed Learning System Breaking New Ground For Soldiers

Project Manager Distributed Learning System

NEWPORT NEWS, Va.--Step through the Army's portal to promotion points and better pay. Interested? Read on. Imagine being able to go on-line, select a course that you need for promotion points or an upcoming deployment, without ever leaving your duty station or your home. Now Soldiers can register for that course, take the course, and have the results put in your training and personnel record for credit accountability and, for enlisted personnel, for promotion points. The promotion points, of course, lead to better pay.

The Distributed Learning System (DLS) is breaking new ground by bringing training to the Soldier whenever and wherever needed.

You do not have to imagine being able to do this or wait for this to happen in the future, because the future is now. The Army is embarking on a course of action that will revolutionize Army training. The Distributed Learning System (DLS) is breaking new ground by bringing training to the Soldier whenever and wherever needed.

According to a former Secretary of the Army, "It is critical that we upgrade the skills of our Soldiers, but sometimes it is hard to work on education because of [Soldiers'] irregular schedules, deployments, reassignments and family commitments. Distance learning knocks down all those barriers."

DLS is the infrastructure that delivers distributed learning, providing the Soldier self-development, unit and mission-critical training to support both synchronous training (where the instructor and student interact while linked via videoconferencing, teleconferencing or the Internet) and asynchronous training (where the instructor and student interact via e-mail and the Internet). Distributed learning instruction may not even require an instructor's presence. It can involve several types of media, and emphasizes the use of reusable content, networks and learning management systems.

"One of the things that's important to the Army leadership from the chief of staff on down, whether it's the officer or the NCO chain, is Soldiers being able to reach out and touch training. That's the bottom-line message," said Col. Sharon Holmes, project manager for DLS. DLS consists of five components including Digital Training Facilities (DTFs), the Army Learning Management System (LMS), Army e-Learning, an Enterprise Management Center (EMC), and the development of the Deployed Digital Training Campus (DDTC).

PMO DLS and TRADOC TPIO are the teams that are changing the face of training through the use of distributed learning which provides high quality, standardized web-based courseware at the right place and right time for the Soldier. Soldiers can take advantage of the DLS DTFs, which were developed to provide soldiers a place to access Web-based, job-related and self-development courses away from the work place and distractions of home. DLS, under the direction of Holmes, has successfully fielded 274 fully operational DTFs worldwide. TRADOC oversees the development of Military Occupational Specialty Qualification (MOSQ) courseware and is an integral part of the Army team fielding the Army LMS. Together they have witnessed a positive impact on the individual Soldier and unit readiness.

DLS is currently fielding the exciting new Army LMS. This powerful technology provides continuous access to distributed learning courseware and collaboration with other students and instructors. From the office, home or DTF, Soldiers will be able to meet their training needs, including access to content, course catalogs and schedules, collaborative resources, and training history.

The combined capabilities of the DTFs and the Army LMS will make training coordination more efficient, delivery more flexible, and provide soldiers the ability to track their own training history. According to Holmes, "The Army LMS has the potential to touch every Soldier and civilian in the U.S. Army."

Distributed learning affords the Soldier many benefits, including increased training flexibility and opportunities, and less time away from their duty station and family. Benefits also include improved training coordination and information access for the Soldiers, leaders, training officers and NCOs in determining training requirements as well as training status.

As Holmes said, “DLS provides the ability to distribute standardized training to individual soldiers and units through the application of information technology.”

For more information on your training future and the Digital Training Facility nearest to your location, please visit the following DLS websites at www.dls.army.mil and www.dls.army.mil/DTFContacts.doc.

(Submitted by Project Manager Distributed Learning System)

Expeditionary Kitchen Expands

U.S. Army Soldier Systems Center

NATICK, Mass. -- "A" rations are taking the "S" out of SPEK. The Single Pallet Expeditionary Kitchen (SPEK), designed in 2002 by the Systems Equipment and Engineering Team at the Department of Defense Combat Feeding Directorate, located at the U.S. Army Soldier Systems Center here, has grown to cook the top choice in field feeding options, A rations.

Initially capable of preparing heat and serve meals, the kitchen satisfies the Air Force requirement for a highly mobile, temporary kitchen on deployments to remote, undeveloped locations. Although the SPEK can still fit onto one C-130, 463L load pallet, extra equipment to prepare A-ration meals may eventually mean packing a second pallet for transit.

"We'll have the ability to serve fresh foods and extend deployment of the system," said Ken Ryan, project officer. "By expanding the equipment, we're expanding the capacity and don't have to rush to set up a bare base kitchen. It's going to evolve into a new kitchen, and we're going to have to come up with a new acronym."

An Expandable Small Air Mobile Shelter is another possible air or ground transportation platform to contain a larger version of the kitchen, according to Ryan. Regardless of how it travels, the items are easy to unpack, set up and operate, and then pack up for its next location.

With the changes, the kitchen can feed as many as 550 airmen, instead of 300 with the original SPEK, in a two-hour period twice a day for up to 45 days for heat and serve, and A rations. A user-test Nov. 6-7 with the Massachusetts National Guard 104th Fighter Wing in Westfield during its "Thunder Wart" exercise demonstrated how well it works.

More than 550 airmen, including members of the Army's 226th Division Aviation Support Battalion, were fed in a two-and-a-half hour period, a remarkable feat because food personnel were trained that morning and warfighters had a choice of three entrees, two starches and two vegetables, said retired Navy Master Chief Louis Jamieson, an equipment specialist.

The SPEK carries everything except fuel, water and rations. A TEMPER or similar tent with interior lighting provides shelter for the cooking and serving equipment. The upgraded SPEK adds a 3-kilowatt generator to the 2-kilowatt generator to handle increased electrical demand, but a Spider temporary power distribution system can be used if higher-capacity power is available on-site, Ryan said.

Food storage and beverage containers, hand-washing stations, tables and the Multi Ration Heater-used for heat and serve tray rations and No. 10 food service cans-are the same, but the kitchen's sanitation center has been revised and flooring replaced.

Three lines were modified into a single in-line steam manifold that feeds water to three sprayers independently controlled in each well for rinsing, washing and sanitizing for the sanitation center. A hose also provides hot water for coffee and reconstituted foods, such as mashed potatoes, while another spray hose can rinse kitchen utensils.

"Now the sanitation package is much more robust. There are fewer parts, less maintenance, and it decreased the amount of space it takes up," said Rob DiLalla, a mechanical engineer.

Flooring has been upgraded with a mat system manufactured by Soloco LLC. Key advantages are a non-skid rubberized surface with built-in drains, reduced weight, impact absorption and smooth edges, according to Anthony Cellucci, an engineering technician.

"The other flooring was brittle, it stained easily, was slick, had sharp edges and had snaps that tended to break when assembling the section together," he said.

New components that enable fresh rations to be prepared are the griddle, convection oven and a pressureless steamer. Along with the sanitation center, each is connected to its own interchangeable burner base fed on common battlefield fuel in a closed system that yields no fumes or open flames, Ryan said. Temperature for each appliance is adjustable by a thermostat.

"Thermostatic controls are the biggest difference in any field kitchen," Jamieson said. "You get even cooking and heat distribution. You would have to guess the temperature otherwise."

He described the cooking uniformity of the griddle designed and soon-to-be patented by the team as "phenomenal," with no swings in surface temperature as hamburgers, pancakes or any other griddle-cooked foods are moved or turned.

Uniform baking is also heralded with the natural convection oven. Ryan said the design is unusual because it's a commercial product adapted to a burner, something not normally seen in the field.

The SPEK comes with a spare parts kit for quick repairs and replacements for the major components, and the entire platform can be arranged as desired by the cooks.

Air Force National Guard units are the first to see the redesigned SPEK, but Ryan said the kitchen could become valuable for other military services.

(Submitted by U.S. Army Soldier Systems Center Public Affairs Office)